

FOOD HYGIENE PRACTICES AMONG PROFESSIONAL CULINARY FOOD HANDLERS

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ABSTRACT

Food hygiene is an essential component of public health and is particularly important in professional culinary environments where large quantities of food are prepared, stored, cooked, and served to consumers. Professional culinary food handlers, including chefs, cooks, kitchen assistants, servers, and other food-service employees, have an important role in preventing food contamination and foodborne diseases. Unsafe practices such as inadequate handwashing, cross-contamination between raw and cooked foods, improper temperature control, poor personal hygiene, unsafe thawing, inappropriate food storage, and inadequate cleaning and sanitation can increase the risk of foodborne illness. The World Health Organization promotes five basic principles for safer food: keeping clean, separating raw and cooked foods, cooking thoroughly, keeping food at safe temperatures, and using safe water and raw materials. The literature also indicates that food safety training can substantially improve knowledge, although improvement in knowledge does not always guarantee sustained behavioural change. Systematic reviews suggest that training interventions can improve knowledge and, in some circumstances, attitudes and practices, while workplace resources, management commitment, supervision, and food safety culture also influence compliance. Therefore, effective food hygiene requires not only individual knowledge but also supportive organizational systems, adequate facilities, monitoring, continuous training, and management commitment.

KEYWORDS: Food hygiene, food safety, food handlers, culinary professionals, hand hygiene, cross-contamination, foodborne disease, sanitation, food safety training, restaurant hygiene.

INTRODUCTION

Food is essential for human survival, health, growth, and wellbeing. However, food can also become a vehicle for disease when it is contaminated during production, preparation, storage, transportation, or service. Foodborne diseases can result from biological hazards such as bacteria, viruses, parasites, and fungi, as well as chemical and physical hazards. Because food is handled by people at numerous stages of the food chain, human behaviour represents an important component of food safety. Professional food handlers are therefore responsible for applying appropriate hygiene practices during food preparation and service. The food-service industry has expanded considerably in many countries because of urbanization, changing lifestyles, tourism, increased employment, and consumer demand for prepared foods. Restaurants, hotels, catering businesses, institutional kitchens, hospitals, schools, universities, and commercial food outlets prepare meals for large numbers of people every day. A single unsafe food-handling practice in such an environment can potentially affect many consumers. Professional culinary food handlers therefore have a particularly important responsibility because they work directly with food intended for consumption. The World Health Organization (WHO) identifies five basic principles for safer food: keep clean; separate raw and cooked food; cook food thoroughly; keep food at safe temperatures; and use safe water and raw materials. These principles provide a practical framework for food handlers and are applicable to both domestic and professional food preparation environments.

Personal hygiene is one of the most important elements of food hygiene. Food handlers may contaminate food through their hands, clothing, hair, respiratory secretions, wounds, or other sources if appropriate hygiene practices are not followed. Handwashing is particularly important because hands frequently come into contact with raw foods, equipment, utensils, waste, money, surfaces, and other people. If hands are not washed properly before handling ready-to-eat food, microorganisms may be transferred directly to food. Hand hygiene should occur at appropriate moments, including before beginning food preparation, after handling raw meat or poultry, after using the toilet, after touching waste, after coughing or sneezing, after handling potentially contaminated objects, and whenever contamination is likely. Danquah, E., & Morgan, A. K. (2025). Found that Appropriate handwashing involves using suitable water and soap and ensuring that all areas of the hands are adequately cleaned. Feleke, S. F., Dessie, A. M., Kidie, A. A., Kassa, M., Habtie, T. E., Tesfa, N. A., ... & Abebe, W. (2025). Explained In professional kitchens, access to suitable handwashing facilities is therefore an important organizational requirement rather than merely an individual responsibility. Cross-contamination is another major concern in professional culinary environments. Cross-contamination occurs when microorganisms or other hazards are transferred from one food, surface, utensil, or person to another. Raw meat, poultry, seafood, eggs, vegetables, and other ingredients may carry microorganisms that should not be transferred to cooked or ready-to-eat foods. For this reason, professional kitchens should use appropriate separation between raw and cooked foods, clean and sanitize equipment appropriately, and use suitable utensils and cutting boards.

A study conducted among food handlers in Lahore demonstrated the importance of these practices. Ahmed, Akbar, and Sadiq investigated food safety knowledge, attitudes, and practices among 202 food handlers working in small-scale restaurants, hotels, and eateries. The researchers found that 57.9% reported washing their hands before cooking or serving food, while 91.1% reported using separate utensils for raw and cooked foods. At the same time, 72.8% did not know the appropriate standard method for thawing frozen foods and reported thawing food at room temperature. PMC These findings demonstrate that food handlers may follow some appropriate practices while simultaneously having important knowledge gaps. Temperature control is also fundamental to food hygiene. Microorganisms can multiply rapidly when food is stored under unsuitable conditions. Professional food handlers must therefore understand the importance of cooking, holding, cooling, thawing, and refrigeration procedures. Hot foods should be maintained at appropriate safe temperatures, while perishable foods should be refrigerated appropriately. Food should not be left unnecessarily at temperatures that allow microorganisms to multiply rapidly. Cooking is an important control measure because adequate heat can destroy many pathogenic microorganisms. However, cooking alone cannot guarantee food safety. Cooked food can become contaminated again through dirty utensils, contaminated surfaces, unwashed hands, raw food contact, or inappropriate storage. Consequently, food hygiene must be viewed as a continuous process that begins with receiving raw materials and continues through preparation, cooking, holding, service, and cleaning.

The quality and safety of raw materials also influence the final product. Food handlers should inspect ingredients before use, observe expiration or use-by dates where applicable, maintain appropriate storage conditions, and obtain food from reliable sources. Damaged packaging, spoiled ingredients, contaminated water, and inappropriate storage can introduce hazards before food preparation even begins. In Lahore, approximately 80.7% of food handlers in one study reported checking expiry dates before using food products, illustrating that some preventive practices were relatively common.

Cleaning and sanitation are equally important. Professional kitchens contain numerous surfaces and pieces of equipment, including knives, cutting boards, counters, refrigerators, cooking equipment, utensils, sinks, and storage containers. If these are not properly cleaned and sanitized, microorganisms can survive and contaminate food. Cleaning removes dirt and organic material, while appropriate sanitation reduces microorganisms to safer levels. Explains, A professional food hygiene system therefore requires written cleaning procedures, suitable cleaning materials, appropriate frequencies, and monitoring. Food hygiene is not determined solely by what workers know. Research on food handlers repeatedly demonstrates a gap between knowledge and actual behaviour. Zanin et al., in an integrative review of 36 original studies, reported that approximately half of the reviewed articles identified inadequate translation of knowledge into attitudes or practices, or of attitudes into practices. The review emphasized that knowledge, attitudes, and practices should be evaluated together and that additional diagnostic approaches are needed to understand food-handler behaviour. This distinction is important for professional culinary education. A chef may know that handwashing is important but fail to wash hands consistently during a busy service period. A cook may understand cross-contamination but use the same cutting board for raw chicken and salad preparation because separate equipment is unavailable. A worker may understand the importance of refrigeration but leave prepared food at room temperature because of time pressure. Therefore, food hygiene is influenced by knowledge, attitudes, environmental conditions, workload, availability of equipment, management practices, supervision, and organizational culture.

Professional culinary employees may change jobs, enter the industry without formal food safety education, or forget practices that are not reinforced. Continuous training, practical demonstrations, supervision, refresher sessions, workplace reminders, and management monitoring can help maintain food hygiene standards. Food safety culture has also become an important area of research. A strong food safety culture exists when food safety is supported by leadership, management commitment, employee commitment, appropriate resources, policies, and everyday workplace practices. Research involving 331 restaurants identified leadership, management commitment, employee commitment, and resource availability as important components of restaurant food safety culture. This means that responsibility for food hygiene cannot be placed entirely on individual food handlers. If employees are expected to wash their hands but sinks lack soap or running water, safe behaviour becomes difficult. If management prioritizes speed over food safety, employees may feel pressure to ignore procedures. If there are no clear policies or monitoring systems, unsafe practices may continue. Consequently, food hygiene should be considered both an individual and organizational responsibility. The situation is particularly important in developing countries, where rapid expansion of food-service businesses may occur alongside differences in

regulatory enforcement, food safety education, infrastructure, and access to training. Research in Pakistan illustrates the importance of continued attention to food hygiene. In a study of 300 food handlers working in university canteens in Lahore, approximately 60% of responses were correct overall, while attitudes and practices also showed areas requiring improvement. International evidence demonstrates that food hygiene challenges are not restricted to one country. Faour-Klingbeil, D., Osaili, T. M., Shalaby, H. Y., Hassan, F., & Todd, E. C. (2026). Revealed, Studies from different geographical regions have identified variations in food safety knowledge and practices among food handlers.

RESEARCH OBJECTIVE

1 To examine food hygiene practices among professional culinary food handlers and identify the major factors influencing safe food-handling practices in professional food-service environments.

RESEARCH QUESTION

1 what factors influence their compliance with safe food-handling practices?

LITERATURE REVIEW

Food hygiene refers to the conditions and measures necessary to ensure the safety and suitability of food throughout preparation, handling, storage, cooking, and service. It includes personal hygiene, cleaning and sanitation, temperature control, prevention of cross-contamination, safe water, appropriate food storage, pest control, and safe handling of raw materials. Food handlers should maintain clean hands, clean clothing, appropriate hair restraints, and appropriate personal cleanliness. Individuals who are ill with symptoms that could contaminate food should follow workplace illness policies and should not handle food when doing so presents a significant food safety risk. Hand hygiene is especially important. Hands can transfer microorganisms between raw foods, cooked foods, equipment, surfaces, and consumers. Professional kitchens should therefore provide suitable handwashing facilities and establish procedures requiring handwashing at appropriate points during food preparation. The Lahore study by Ahmed et al. illustrates that hand hygiene may not always be practiced consistently. Halim, S. F. B., Mamun, T. M., & Naim, J. (2026). Elaborated on Only 57.9% of surveyed food handlers reported always washing their hands before cooking or serving food. This finding indicates the need for practical education and workplace monitoring. Cross-contamination is the transfer of harmful microorganisms or other hazards from one source to another. It can occur through hands, knives, cutting boards, utensils, containers, work surfaces, cloths, refrigerators, and other equipment.

The separation of raw and cooked foods is therefore essential. Raw poultry and meat should not come into contact with ready-to-eat foods. Separate utensils and equipment should be used where possible, while equipment should be appropriately cleaned and sanitized between tasks. In the Lahore study, 91.1% of participants reported using separate utensils for raw and cooked food. However, the existence of a reported practice does not necessarily establish that the practice is consistently followed in real workplace conditions. This highlights the

limitation of relying entirely on self-reported questionnaires. Temperature control is another essential component of food hygiene. Food handlers should understand the importance of maintaining appropriate temperatures during cooking, cooling, refrigeration, hot holding, cold holding, thawing, and transportation. Incorrect temperature control may allow microorganisms to multiply. Food safety procedures should therefore include appropriate monitoring systems, thermometers where necessary, refrigeration maintenance, and clear procedures for handling potentially hazardous foods. The Lahore research identified a specific knowledge gap in thawing practices. Approximately 72.8% of participants were unaware of standard thawing procedures and reported thawing frozen foods at room temperature. This demonstrates why food safety education needs to address practical procedures rather than only general concepts. Cleaning removes food residues, dirt, grease, and other materials from surfaces and equipment. Sanitation is a further step intended to reduce microorganisms to an acceptable level. Professional kitchens require systematic cleaning and sanitation of equipment, utensils, work surfaces, storage areas, floors, sinks, refrigerators, and other relevant areas. Cleaning schedules can help ensure that food-contact surfaces are not neglected during busy operations. Al-Sakkaf, A. (2026). Found that Managers should establish responsibilities and verify completion. Employees should also understand that visually clean surfaces are not necessarily microbiologically safe. Knowledge refers to what food handlers understand about food safety, while attitudes refer to their beliefs and perceptions concerning food safety. Practices refer to what workers actually do. The KAP framework is frequently used to study food handlers. Zanin et al. found that knowledge, attitudes, and practices do not necessarily develop together.

EYoung et al.'s systematic review and meta-analysis concluded that food safety education and training interventions improve food-handler knowledge, while evidence for sustained behaviour change is more complex. Another meta-analysis involving 31 studies found positive effects of training on knowledge, attitudes, and overall food safety practices. These findings support the importance of training while also demonstrating the need to evaluate whether learning is translated into actual workplace behaviour. Food safety culture concerns the shared values, beliefs, behaviours, policies, and organizational practices that influence food safety. It extends the focus beyond individual workers. Research involving restaurant workers found four major components of food safety culture: leadership, management commitment, employee commitment, and resources. This suggests that food safety performance is influenced by the environment in which employees work. Management should therefore provide appropriate facilities, equipment, training, policies, supervision, and time for employees to perform food safety tasks correctly. Food hygiene is particularly relevant to Pakistan because of the large and diverse food-service sector. Restaurants, hotels, street food businesses, institutional kitchens, catering operations, and other establishments prepare food for millions of consumers. Fanta, S. S., Yesuf, M. B., & Demissie, T. A. (2023). The Lahore study by Ahmed et al. provides important evidence concerning professional food handlers. Explains. The research involved 202 food handlers and found significant relationships between demographic characteristics, food safety knowledge, attitudes, and practices. Another study involving 300 food handlers at university canteens in Lahore found that only about 60% of responses were correct overall, with several areas of knowledge, attitude, and practice requiring improvement. These studies demonstrate the importance of continuing food hygiene education and monitoring in Pakistani food-service environments.

METHODOLOGY

The present research uses a qualitative, literature-based research approach to examine food hygiene practices among professional culinary food handlers. This approach is appropriate because the objective is to synthesize existing evidence concerning food hygiene behaviours, food safety knowledge, training, organizational factors, and workplace practices. Rather than generating numerical results from a newly recruited sample, the study examines published research and authoritative food safety guidance to identify common patterns and important themes. The literature was examined with particular attention to professional food-service environments, including restaurants, hotels, institutional kitchens, university canteens, and other commercial food establishments. Studies focusing on food handlers were considered particularly relevant because these workers have direct responsibility for receiving, preparing, cooking, storing, and serving food. The research approach also recognizes that food hygiene is a multidimensional phenomenon. Knowledge alone cannot fully explain food-handler behaviour. Consequently, the literature was examined in relation to knowledge, attitudes, personal hygiene, handwashing, cross-contamination, temperature control, cleaning and sanitation, food safety training, workplace resources, management commitment, and food safety culture. The literature-based approach provides an opportunity to compare findings from different countries and food-service settings. It also makes it possible to identify areas of agreement and disagreement among previous researchers. For example, several studies support the importance of food safety training, while reviews indicate that improvements in knowledge do not always result in equivalent improvements in behaviour.

RESEARCH DESIGN

A descriptive integrative literature-review design was used. An integrative design allows evidence from different types of research to be brought together to develop a broader understanding of food hygiene practices. This is appropriate for the current topic because food safety research includes cross-sectional KAP studies, intervention studies, systematic reviews, food safety culture studies, and international guidance. Relevant literature was identified through searches using terms such as food hygiene practices, food handlers, professional food handlers, culinary food safety, restaurant food safety, food safety knowledge, food safety attitudes, food safety practices, food handler training, hand hygiene, and cross-contamination. Scholarly databases and sources such as PubMed, ScienceDirect, and Google Scholar-indexed publications were prioritized. The inclusion focus was on literature addressing food handlers working in food-service environments and studies examining hygiene, food safety practices, knowledge, attitudes, training, or workplace factors. WHO publications and other authoritative food safety materials were also included because they provide internationally recognized principles for safe food handling. The design does not claim to provide a representative statistical estimate of all professional culinary food handlers. Instead, it synthesizes findings from available research. This is important because food hygiene practices vary according to country, establishment type, regulatory environment, worker education, workplace resources, and management systems.

DATA ANALYSIS

The information identified in the literature was analyzed using thematic analysis and narrative synthesis. Findings were first organized into major themes relating to personal hygiene, handwashing, cross-contamination, temperature control, cleaning and sanitation, food storage, food safety knowledge, training, and organizational food safety culture. The second stage involved comparing findings between studies. Particular attention was given to areas where studies reported similar results. For example, the literature consistently identifies personal hygiene and cross-contamination prevention as important components of food safety. WHO's Five Keys framework similarly emphasizes keeping clean and separating raw and cooked foods. The third stage involved identifying differences and gaps. For example, some studies report satisfactory food safety practices despite inadequate knowledge. The Lahore research found good attitudes and relatively satisfactory reported practices alongside poor knowledge, demonstrating that the relationship between knowledge and practice is not always straightforward. Finally, the evidence was interpreted in relation to the research objective and research question. The analysis considered not only individual food-handler behaviour but also training, resources, leadership, management commitment, and organizational culture. This broader approach is supported by food safety culture research showing that leadership, management commitment, employee commitment, and resource availability are important organizational dimensions. ScienceDirect

FINDINGS

The literature demonstrates that personal hygiene is one of the most important areas of food safety practice among professional food handlers. Hands can transfer microorganisms from raw food, waste, equipment, surfaces, and other sources to ready-to-eat food. Appropriate handwashing and personal cleanliness are therefore essential. The WHO Five Keys framework places "keep clean" as its first principle for safer food. One of the most important findings in studies of food handlers is that knowledge of food hygiene does not always translate into appropriate hygienic practice. Many professional food handlers are familiar with basic principles such as handwashing, keeping raw and cooked foods separate, cooking food thoroughly, and maintaining clean working surfaces. However, practical compliance can be affected by workload, time pressure, inadequate facilities, lack of supervision, insufficient training, and workplace culture. Personal hygiene is an essential component of safe food handling. Appropriate practices include regular handwashing, maintaining clean hands and fingernails, wearing clean protective clothing, covering hair, and avoiding food preparation when experiencing symptoms such as vomiting or diarrhea. Hand hygiene is particularly important because hands can transfer microorganisms from raw foods, contaminated surfaces, equipment, or the food handler's body to ready-to-eat foods. The World Health Organization identifies hand hygiene as one of the key measures for preventing food contamination. However, observational studies have shown that food handlers may not always wash their hands at the appropriate times or use adequate handwashing procedures. Effective handwashing requires access to suitable facilities, clean running water, soap, and appropriate drying methods. Food handlers should wash their hands before beginning food preparation, after using the toilet, after handling raw meat or other potentially contaminated materials, after touching waste, and whenever their hands may have become contaminated. A recurring finding in food-safety research is that

availability of handwashing facilities alone does not guarantee correct hand hygiene. Compliance depends on both individual behavior and organizational conditions.

CONCLUSION

Food hygiene practices among professional culinary food handlers are an essential component of foodborne-disease prevention and public health. The preparation and service of food involve numerous opportunities for contamination, including handling raw ingredients, contact with equipment and surfaces, inadequate personal hygiene, improper storage, insufficient cooking, inappropriate holding temperatures, and cross-contamination between raw and ready-to-eat foods. Professional food handlers therefore occupy an important position in the food-safety chain. The overall evidence indicates that food handlers commonly possess at least a basic understanding of important food-hygiene principles, but the consistent application of these principles in daily practice remains a challenge. Knowledge alone is insufficient to ensure safe food handling. Differences between what food handlers know and what they actually do may arise from workload, time constraints, inadequate facilities, insufficient supervision, lack of equipment, workplace norms, and limited opportunities for refresher training. Hand hygiene remains one of the most important preventive measures. Appropriate handwashing at critical points during food preparation can interrupt the transmission of microorganisms from hands to food. Nevertheless, compliance depends on convenient access to water, soap, hand-drying facilities, and organizational encouragement. Food-service establishments should therefore ensure that suitable handwashing facilities are easily accessible and continuously maintained. Preventing cross-contamination is equally important. Raw meat, poultry, seafood, eggs, and other potentially contaminated ingredients should be handled separately from cooked and ready-to-eat foods. Separate utensils and cutting boards, appropriate storage arrangements, effective cleaning and disinfection, and good hand hygiene can substantially reduce opportunities for contamination. Temperature control is another central element of food safety.

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